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Development of Geomagnetic Monitoring System Using a Magnetometer for the Field

Young-Cheol Lee (1), Sung-Wook Kim (2), Eun-Kyeong Choi (2), and In-Soo Kim (3)

(1) Earth Science Education, Pusan National University, Busan, Korea (geoyoung@pusan.ac.kr), (2) Gi Co. Ltd., Busan, Korea, (3) Department of Geological Sciences, Pusan National University, Busan, Korea

Three institutes including KMA (Korea Meteorological Administration), KSWC (Korean Space Weather Center) of NRRA (National Radio Research Agency) and KIGAM (Korea Institute of Geoscience and Mineral Resources) are now operating magnetic observatories. Those observatories observe the total intensity and three components of geomagnetic element.

This paper comes up with a magnetic monitoring system now under development that uses a magnetometer for field survey. In monitoring magnetic variations in areas (active faults or volcanic regions), more reliable results can be obtained when an array of several magnetometers are used rather than a single magnetometer. In order to establish and operate a magnetometer array, such factors as expenses, convenience of the establishment and operation of the array should be taken into account. This study has come up with a magnetic monitoring system complete with a magnetometer for the field survey of our own designing.

A magnetic monitoring system, which is composed of two parts. The one is a field part and the other a data part. The field part is composed of a magnetometer, an external memory module, a power supply and a set of data transmission equipment. The data part is a data server which can store the data transmitted from the field part, analyze the data and provide service to the web.

This study has developed an external memory module for ENVI-MAG (Scintrex Ltd.) using an embedded Cortex-M3 board, which can be programmed, attach other functional devices (SD memory cards, GPS antennas for time synchronization, ethernet cards and so forth). The board thus developed can store magnetic measurements up to 8 Gbytes, synchronize with the GPS time and transmit the magnetic measurements to the data server which is now under development. A monitoring system of our own developing was installed in Jeju island, taking measurements throughout Korea. Other parts including a data transfer module, a server and a power supply using solar power will continue to be developed in the days to come.

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